Agriculture Water Quality Alliance

Land-Sea Partnerships to Protect the Waters and Watersheds of the Monterey Bay National Marine Sanctuary

Summary Report of the Monterey Bay National Marine Sanctuary's Agriculture and Rural Lands Plan Implementation

OCTOBER 1999 - OCTOBER 2004

Resource Conservation Districts

UCCE

NRCS

Agriculture Water Quality Alliance

•

Land-Sea Partnerships
to Protect the Waters and Watersheds
of the Monterey Bay
National Marine Sanctuary

OVERVIEW

The Monterey Bay National Marine Sanctuary's (Sanctuary) Agriculture and Rural Lands Plan (Agriculture Plan), identifies voluntary strategies to prevent nonpoint source runoff from agricultural operations and rural lands. Since the Agriculture Plan was written in 1999, more farmers and ranchers are using management practices on their properties to reduce runoff of sediments, nutrients and pesticides, protecting water quality within the watersheds that drain to the Sanctuary. Guiding the implementation of the Agriculture Plan is the Agriculture Water Quality Alliance (AWQA), which is a regional partnership of diverse agriculture industry groups, federal, state, and local agencies, technical experts, environmental organizations and university researchers. This report summarizes the work completed under the Agriculture Plan by AWQA partners for the period of October 1999 – October 2004. The results are reported in detail for the following categories:

- **Formation of Watershed Working Groups:** The Central Coast Agricultural Water Quality Coalition has established 23 Watershed Working Groups, comprised of over 400 farmers and ranchers, in watershed areas with known water quality concerns.

- **Water Quality Education and Development of Farm Water Quality Plans:** Over 500 farmers in the region have completed UC Cooperative Extension's Farm Water Quality Planning Short Course, where they develop an individualized Farm Water Quality Management Plan for their operation.

- **Implementation of Water Quality Management Practices:** Local assistance agencies such as the Natural Resources Conservation Service and the Resource Conservation Districts provide technical assistance to farmers for designing and implementing management practices identified in the Farm Water Quality Plans. AWQA partners are working with farmers to increase the number and types of management practices that are used to prevent erosion and nutrient and pesticide runoff. Significant progress has been made to establish Permit Coordination Programs in several counties to simplify the permitting process for farmers that are voluntarily enhancing waterways or installing erosion control structures.

- **Water Quality Monitoring:** Farmers in the Watershed Working Groups have been trained to monitor water quality on their properties to help inform their management decisions. Watershed Working Group participants also participate in watershed-scale monitoring, with compiled data available to the group for management decisions.

Building on Our Success

To build on and expand upon the initial success of the work done under the Agriculture Plan, this report identifies a number of specific future actions which are being planned. In general, these next steps relate to:

• **Increasing outreach to farmers and ranchers about water quality protection.**
Of the approximately 2500 producers in the region, about one-fifth of them are participating in a Watershed Working Group or have taken a Farm Water Quality Short Course.

• **Increasing the number of water quality management practices that are utilized on farm, ranch and rural properties.**
As more producers learn to identify existing and potential water quality problems on their properties and develop working relationships with agency technical assistance staff, the number of management practices in place will increase.

• **Assessing and monitoring water quality improvements.**
There is a combined need to assess individual management practice effectiveness as well as to track watershed-scale water quality over time.

BACKGROUND INFORMATION

California Sea Otter

Monterey Bay National Marine Sanctuary

The Monterey Bay National Marine Sanctuary (Sanctuary) is home to the nation's largest kelp forest, one of its largest underwater canyons, and an enormous diversity of fishes, birds, mammals and other species, twenty-four of which are listed as endangered or threatened. In 1992, following over fifteen years of public pressure, the Sanctuary was designated by Congress and the National Oceanic and Atmospheric Administration (NOAA). This is the nation's largest marine sanctuary, encompassing over 5,000 square miles of marine waters. The sanctuary boundary stretches

from Marin to Cambria, and was designated for the purpose of resource protection, research, education, and public use. Protecting and enhancing water quality is central to meeting the sanctuary's mandate of ecosystem protection.

Central Coast Agriculture

California's Central Coast is also home to another national treasure, the agricultural lands in its rich coastal valleys. The region's unique soils and year-round mild coastal climate sustain a 3.5 billion dollar agricultural industry which produces over 200 types of crops. These include the nurseries and brussel sprouts which thrive along the fog-shrouded San Mateo coast, the diverse row crops, berries and apple orchards of the warm Pajaro Valley, and the strawberry fields lining the steep lands surrounding the Elkhorn and Watsonville Sloughs. The rich soils of the broad flat lands along the Salinas River are the "Salad Bowl of the Nation", producing the majority of the country's lettuce and a diverse mix of vegetables, including broccoli, artichokes, celery, and cauliflower. Monterey County alone produces more than 85% of the nation's leaf lettuce, 84% of its artichokes, 86% of its broccoli and cauliflower, and more than one-third of its celery, strawberries and mushrooms. Rolling grazing lands occupy the slopes of these valleys and much of the watersheds of San Luis Obispo, San Benito, Monterey and Santa Clara Counties, sustaining a cattle industry, providing habitat for wildlife, and improving recharge of local water supplies. In recent years, a portion of the grazing lands in Monterey County has been converted to vineyards. Steeper forested lands occupy much of the upper watersheds in Santa Cruz and San Mateo County, sustaining a timber industry, providing wildlife habitat and recreational opportunities for local residents. Agriculture and the Sanctuary's plants and animals are linked by their mutual dependence on the marine waters which generate the region's unique coastal climate. They are also linked by the drainage patterns of the local watersheds as water flows from the mountains to the flood plains and rivers, and out to sea. This important connection between the land and the sea requires partnerships

Aerial view of Pajaro River and surrounding agriculture land

between the Sanctuary and the agriculture industry to protect and sustain our unique natural resources, the area's vital agricultural and tourist economies, and quality of life for local residents.

Agriculture Plan

Concurrent with the Sanctuary's designation, eight key water quality agencies entered into a Memorandum of Agreement establishing a Water Quality Protection Program (WQPP) for the MBNMS. The WQPP became one of the first programs nationally to develop a water quality program for the reduction and control of non-point source pollution – an approach that required a coordinated effort involving all stakeholders surrounding each issue. This approach led to the development of five stake holder-derived, issue-orientated action plans.

The fourth WQPP plan is the Sanctuary's Agriculture Plan, which was developed in 1999 to address agricultural nonpoint source pollution in the form of sediments, nutrients, and persistent pesticides. The plan was created over a period of three years, stemming from several public workshops, a series of meetings with the Central Coast Agricultural Water Quality Coalition (Coalition), formed originally as the Coalition of Central Coast County Farm Bureaus, Natural Resources Conservation Service (NRCS), Resource Conservation Districts (RCDs), University of California Cooperative Extension (UCCE) and with ongoing review and assistance from the 26 members of the Water Quality Protection Program

Committee consisting of federal, state and local agencies, public and private groups. Guiding the implementation of the Agriculture Plan is the Agriculture Water Quality Alliance (AWQA), which is a regional partnership of diverse agriculture industry groups, federal, state, and local agencies, technical experts, environmental organizations and university researchers.

At the heart of the Agriculture Plan are 24 strategies, intended to protect and enhance the quality of water that drains into the Sanctuary while sustaining the economic viability of agriculture. This voluntary approach is unique in that the Central Coast Agricultural Water Quality Coalition is taking a leadership role in establishing industry-led networks of landowners and operators to address local water quality issues. These projects represent an innovative effort on the part of farmers and ranchers to establish improved management practices, building on the many positive practices already underway in the industry. In addition, there are strategies focused on improving technical assistance and education, funding and economic incentives for management practices, coordination and streamlining of the existing regulatory system in order to reduce barriers to implementing erosion control practices, and improving maintenance practices for rural roadways and public lands. The successful model developed in the Agriculture Plan has been widely recognized throughout the State and is gaining attention from other parts of the country as well.

Increased collaboration

One of the most important results of the Agriculture Plan has been increased collaboration between researchers, agency staff and industry representatives. These organized networks help guide planning and implementation efforts around specific issues, implement conservation programs, and distribute technical information and materials. AWQA partners have been working with local agency staff to develop partnerships related to water quality and agriculture. Some of these agencies include Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (FWS), California Department of Fish and Game (CDFG), and the Regional Water Quality Control Boards (RWQCB). Staff from these agencies have become increasingly involved and supportive of the agricultural industry's efforts and have attended field tours and planning meetings to keep updated on local water quality protection efforts.

AWQA Steering Committee

An AWQA Steering Committee meets monthly to plan and coordinate future implementation, review regional guidelines and establish priority strategies for each year. The committee includes representatives from the Sanctuary, NRCS, RCD, UCCE and the Central Coast Agricultural Water Quality Coalition (Coalition).

The Coalition represents the interests of the Farm Bureaus in San Mateo, Santa Cruz, San Benito, Santa Clara, Monterey and San Luis Obispo. While there are numerous other partners involved in carrying out the Agriculture Plan, these groups have regional representation throughout the six-county area.

I. FORMATION OF WATERSHED WORKING GROUPS

Overview

The establishment of Watershed Working Groups comprised of farmers and ranchers, under the leadership of organizations such as the Central Coast Agriculture Water Quality Coalition and Agriculture and Land-Based Training Association (ALBA), is the critical first step in regional water quality protection. These industry networks take the lead in organizing and working with producers to establish joint projects to protect water quality in priority watershed areas. Industry leadership in water quality protection is critical in identifying priority regions for joint projects, conducting outreach on water quality issues, assisting members in developing and carrying out voluntary site-specific management plans, obtaining outside technical assistance as needed, and tracking implementation success over time. It also ensures the degree of willing cooperation necessary to project success and to the transference of knowledge among landowners.

Central Coast Agricultural Water Quality Coalition (Coalition):

A unique collaboration developed between the Sanctuary and the six County Farm Bureaus during the development of the Agriculture and Rural Lands Plan. The California Farm Bureau Federation (CFBF) had developed its Nonpoint Source Initiative and Strategy 2000 (NPS Initiative). The primary objectives of the NPS Initiative are to organize local, landowner and land manager-based working groups on a watershed (or sub-area of the watershed) basis, and to develop a process and methodology for participants to undertake agricultural nopoint source assessment and control.

The Farm Bureaus in the Central Coast region volunteered to take a leadership role in working with the agricultural industry to address agricultural nonpoint source pollution. The Coalition provides a new level of partnership in the development and implementation of voluntary, cost-effective, producer-directed programs to protect water quality in the greater Sanctuary watershed. The Coalition has recently obtained independent non-profit status as an educational organization. The Coalition organizes local farmers and ranchers into Watershed Working

Groups, enrolls farmers in Farm Water Quality Plan Short Courses, assists farmers with the development and implementation of Agricultural Water Quality Plans, organizes water quality training workshops, and assists with connecting farmers to the appropriate technical support staff from agencies that do planning and design of management practices. Watershed Coordinators have been hired to assist with outreach and assistance in the six counties. Farmers involved in the Coalition program have the tools to conduct confidential on-farm quality monitoring.

Land managers use this water quality data to guide their management decisions and assess water quality improvement over time as they install management practices.

Watershed Working Groups

The cornerstone of this voluntary program is the willing participation of farmers to identify water quality management concerns on their properties, and their ability to implement on-the-ground management practices. By working together in Watershed Working Groups, growers are able to share local knowledge and resources. To date 23 groups have been organized by the Coalition. Over 400 farmers and ranchers are participating in these groups. Growers in watershed groups go through the Farm Water Quality Planning Short Course to develop Farm Water Quality Plans for their properties. The short course is a UC Cooperative Extension program in partnership with NRCS. When a groups is formed, growers work cooperatively to identify local water quality concerns and use different management practices to address problem areas. A diversity of crops are represented in these watershed groups, including cattle, vegetables, vineyards, orchards, field and greenhouse flowers, strawberries, pumpkins, etc.

The Coalition prioritized the formation of agricultural Watershed Working Groups based on the State's 303(d) List of Impaired Water Bodies for agricultural pollutants. The 303(d) List is compiled and updated by the Regional Water Quality Control Board, identifying water bodies with pollutant levels that exceed state standards. The Coalition has formed active groups in 23 watersheds, and a Spanish language Watershed Group was formed in Monterey County by ALBA.

Central Coast Agricultural Water Quality Coalition
Watershed Working Groups

This map is intended for informational use only. Features were selected from the GIS data representing watersheds, streams, and highways obtained from the California Spatial Information Library. The urban areas data was obtained from the U.S. Census Bureau. The most recent and extensive data was used; however that does not guarantee its accuracy. California Farm Bureau Federation will not be liable under any circumstance for any damage with respect to any claim by the user or any third party on account of or arising from the use of this map or data. This map was created for the exclusive use of the Monterey Bay National Marine Sanctuary by the California Farm Bureau Federation. October 2004

San Mateo
Pescadero/Butano
Pilarcitos
Ano Nuevo
Frenchman's Cove

Santa Clara
Llagas
Uvas

Monterey
Chualar/Quail
Tularcitos
Arroyo Seco
Gabilan/Alisal/
Natividad
Elkhorn Slough
(Spanish language)

Santa Cruz
Lower Pajaro
River-Coward
Watsonville Slough /
Beach Road
Elkhorn Slough
Brown's Creek
Pacheco Creek

San Benito
Pacheco Creek/
Tesquisquita Slough
Tres Pinos
San Juan

San Luis Obispo
Los Osos/Chorro
San Miguel/
Estrella River
Nipomo
San Simeon

Spanish Language Watershed Groups

The Elkhorn Slough Watershed Group is the first Spanish speaking agricultural watershed group in the region, organized by ALBA, the Agriculture Land Based training Association. ALBA works with limited resource farmers on the Central Coast to promote ecological land management, social equity, and economic viability. ALBA translated and assisted in the delivery of a culturally appropriate Farm Water Quality Planning Short Course in Spanish for 50 growers in February 2004.

Next Steps:
Secure funding for Watershed Working Groups and staff to do the following:

- Provide individual follow-up to Farm Water Quality Short Course participants to help finalize their Farm Water Quality Plans
- Provide educational workshops to existing watershed working group members
- Identify critical sites for collaborative water quality protection projects
- Assist growers in on-farm monitoring and tracking of management practices
- Facilitate implementation of water quality protection projects by referring growers to technical staff and funding sources
- Increase outreach and technical assistance to Spanish speaking growers
- Offer Spanish language Farm Water Quality Plan Short Courses in other counties

Central Coast Vineyard Group

The Central Coast Vineyard Team (CCVT) is a crop-specific industry network developed to address the particular management practices used in vineyards. CCVT provides training and assistance to wine grape growers and vineyard operators and offers a certification label for vineyard operation that incorporates resource protection measures such as water quality protection. The Positive Points certification system scores growers on resource protection and highlights areas with room for improvement.

Field day during Farm Water Quality Planning Short Course

Although extensive technical information exists on agricultural techniques and tools to improve water quality, this information is not always readily available or presented in a format appropriate for use by growers and ranchers. The following section summarizes the regional efforts to make this information more accessible and useful through increased support for existing technical outreach services, development of networks, cross-training of outreach staff, packaging of easily understood information, and conducting on-site consultations. As the number of growers developing Farm Water Quality Plans increases, it is crucial to ensure that adequate staffing and consistent technical information are available throughout the region.

The Farm Water Quality Planning Short Course

In response to the need for accessible information about water quality protection management practices, a UCCE program in partnership with NRCS and input from other AWQA partners, the fifteen-hour Farm Water Quality Planning Short Course for irrigated agriculture was developed. The course is designed to guide participants through the development of a water quality plan for their operation.

The Short Course teaches basic concepts about watershed function, nonpoint sources of pollution, site-assessment techniques, management alternatives, and techniques for evaluating the success of recommended management practices. Course participants complete confidential nonpoint source site-assessments and Farm Water Quality Plans that integrate production goals with water quality, habitat conservation, and soil conservation goals. The course identifies water quality issues related to agriculture in the areas where the participants are farming. There is technical and agency resources available to assist in the planning, construction and maintenance of management practices, and general assistance available in implementing a Water Quality Plan for their property. Farm Water Quality Plans are important tools for growers to identify water quality management

concerns and to document management decisions linked to water quality changes over time. The components of a Farm Water Quality Plan include:

- Inventory of resources (Mapping, Basin Assessment)
- Statement of Goals (Production, Quality of Life, Water Quality)
- Site-assessment of Nonpoint Source Pollution Impacts from Farming Operations
- Existing and/or alternative management practices
- Evaluation techniques of management practices for surface and groundwater protection

Over 500 farmers in the six-county area have completed the course to date. Through the Short Course, water quality plans have been developed for over 97,200 acres of crop and range land, and identified management practices have been applied on 77,500 acres or about 75% of the planned acreage.

Next steps:

Identify rotation schedule of courses across the six counties to accommodate increased demand by growers to enroll in course. Over fifteen courses are planned in English and Spanish throughout the six counties from September 2004-May 2005.

Cost Estimates for Management Practices

To provide growers with information needed to make planning and management decisions for their operations about the potential financial costs and benefits of each practice, UCCE has conducted research on nine common conservation management practices used in the six-county region. The studies help farmers and landowners understand the estimated costs and potential benefits of each practice. Technical staff from NRCS and RCDs have been trained in using this data in their field consultations. This information has been incorporated into the UCCE Farm Water Quality Short Courses, reaching an estimated 300 farmers since Fall 2003. The practice estimates that are now available are:

- Annually Planted Cover Crop
- Annually Planted Grassed Filter Strip
- Grassed Farm Roads
- Non-Engineered Grassed Waterways
- Non-Engineered Water/Sediment Control Basin
- On-Farm Row Arrangement
- Perennial Critical Area Planting
- Perennial Hedgerow Planting
- Underground Outlets

Next steps:

- Perform economic analyses of additional water quality management practices as identified by local farmers, field and technical staff

- Design decision support tools to allow technical staff and farmers to calculate more site specific costs and benefits

- Increase education and outreach to technical staff and farmers with respect to financial aspects of conservation practices

Online Technical Information Sources

AWQA partners have been working to

Congressman Sam Farr speaking at press event 2002

compile regional technical information and make it available online to growers, field staff, and the interested public. The NRCS and RCDs have begun compiling technical information on management practices for the AWQA Web site. The Web site was designed for use by technical field staff, farmers and ranchers and the interested public. Examples of some of the newly developed information sources available on the web site include:

- Cost Estimates for nine water quality management practices (UCCE)
- 48 Management Practice Fact Sheets (UCCE, Farm Water Quality Short Course)
- Furrow Alignment Guide (Santa Cruz County RCD, in Spanish and English)
- Controlling Erosion on Hillside Farm Roads (Santa Cruz County RCD)
- Irrigation Scheduling of Vegetable and Row Crops (UCCE, English and Spanish)
- Handbook of Agricultural Conservation Practices (RCD of Monterey County)

Making these materials more accessible online will assist with outreach by field staff as well as provide resources to growers that may not have established relationships with field staff. The web site will be updated periodically, based on new information and feedback from users. The website can be accessed at **www.awqa.org**

Education and Public Relations

There is a need for improved education of the general public about agricultural management issues, and of agricultural groups and the public about watershed issues as a whole. There is a need to enhance public, grower, government agency, and media knowledge about watershed issues, and develop better recognition of the management practices that the agricultural community already employs.

To date:

- Two major press events have been held to highlight AWQA regional activities and promote management practices, including an event in 1999 to mark the release of the Sanctuary Agriculture Plan and an event in 2002 highlighting accomplishments of the first few years.

- A public relations firm was contracted to help develop a media kit explaining watershed management and agricultural management practices that protect water quality. Materials from the press kit have been used in field tours and distributed for media inquiries.

- An AWQA Web site was developed in 2004, designed to educate both the public and the agriculture industry about watershed management and agricultural management practices. Visit www.awqa.org.

• Farmer and ranchers profiles highlighting growers with model water quality protection practices have been developed for use in the media and for the web site.
• The Sanctuary worked with the Ecological Farming Association to develop a pre-conference day and tours with the theme "Farms and Fishes" at the 2004 Ecological Farming Association conference. The conference and tours highlighted the connection between the health of our coastal watershed and the management practices that occur on land.

• Outreach presentations were given by the sanctuary and other partners at the annual sanctuary symposiums, university classes, farm tours, and other events with general audiences.

III. IMPLEMENTING WATER QUALITY MANAGEMENT PRACTICES

Local vineyard with cover crops

Local Technical Assistance Staff

Several new technical assistance field staff have been hired by the agricultural agencies (NRCS, UCCE, RCDs) to assist farmers and ranchers in the six-county area with protecting water quality. New hires include an Agronomist, Water Quality Monitoring Specialist, Rural Roads Engineer, Rangeland Specialist, Irrigated Agriculture Specialist and Research Assistant, Hydrologist, Outreach Coordinator. These positions were hired with funding through a Congressional allocation in the US Department of Agriculture budget through NRCS to implement the Agriculture Plan as well as from grant funds tied to the implementation of the Agriculture Plan. The role of these staff is to meet the increased demand by growers for assistance with planning, design, implementation, practices as well as to train existing agency staff in meeting these needs. The following are some examples of the types of services these technical staff positions have made possible:

• Assistance to farmers in developing nutrient management plans to optimize timing of fertilizer applications to avoid leaching or runoff
• Assistance to farmers in evaluating irrigation efficiency to reduce runoff to local waterways.

Sediment Basin

• On-farm evaluation of commonly used pesticides to determine if the application method poses a risk to ground or surface waters.
• Guidance to ranchers on weed management alternatives.
• Evaluation of pasture residue levels to prevent rainfall erosion of grazed lands.
• Coordination and technical presentations at Farm and Ranch Water Quality Planning Short Courses.
• Ranch road evaluations to identify erosion causes.
• Assistance to farmers and watershed groups in conducting water quality monitoring.
• The RCD of Monterey County developed a "Technical Tool Kit", designed for use by field staff when conducting on-site consultations. These binders include a regional compilation of technical brochures, fliers, fact sheets and illustrative photos produced by agencies, industry groups and technical support organizations. Photos in the binder illustrate common management practices that protect water quality in the Salinas Valley. The need for a field guide of management practices was identified by both growers and technical field staff, in order to easily describe applicable management practices to land managers. These materials have been developed so that they can easily be adapted for other areas throughout the Central Coast.

Next Steps:

• Further increase technical assistance staff in region in response to agricultural industry's technical needs.

• Adapt Field Guide for other areas and distribute to technical field staff

Permit Coordination and Regulatory Streamlining

Both agency staff and landowners have acknowledged the difficulty of the existing permitting process. Multiple

agencies have jurisdiction over projects, and a land manager may need to obtain multiple permits from up to seven regulatory agencies at the local, state, and federal levels, each with separate fees, different requirements and timelines, and sometimes contradictory mandates, even for projects which have a beneficial impact on water quality. To remove this disincentive for conservation work, there is a need to simplify and coordinate the existing permitting process, more effectively apply existing regulations, and strengthen collaborative efforts between the regulatory agencies and the landowners for practices which protect water quality.

Significant progress has been made by AWQA partners to streamline the regulatory process for agricultural land managers who seek to enhance environmental conditions on their lands:

• A watershed level Permit Coordination Program for the Salinas Valley Watershed in Monterey County, modeled after the successful Elkhorn Slough Permit Coordination Program, was developed in 2003 in partnership with Sustainable Conservation (a non-profit organization), NRCS, the RCD of Monterey County, and the Monterey Bay Sanctuary Foundation. Under a watershed permit, certain management practices are pre-approved by the agencies when growers work directly with NRCS and/or RCD to design and install the practices according to pre-arranged conditions. This is expected to lead to an increased number of on-the-ground projects that protect water quality.

• The RCD of Monterey County and NRCS continue to maintain and also renew existing permits for the Elkhorn Slough Watershed Permit Coordination Program. During the first five years of the Program, 43 projects were planned and authorized under the program and resulted in significant on-farm sediment detention. The Program also allowed for increased restoration work in degraded riparian areas.

• Sustainable Conservation began work with the Santa Cruz County RCD and NRCS in 2002 to prepare a county-wide Permit Coordination Program to be completed in Spring 2005.

• A permit coordination process for developing off-stream irrigation ponds is being developed by Sustainable Conservation in San Mateo and northern Santa Cruz Counties in partnership with NRCS, County Farm Bureaus, and RCDs. Landowners are willing to build irrigation water storage ponds that will collect and store winter water so that water is not excessively overdrawn from fish-bearing streams in the summer months when water levels are already low. The need for new ponds to protect fish habitat has been identified in numerous coastal watersheds including Gazos Creek, Cascade, and Pilarcitos.

Next Steps:

• Expand permit coordination programs to the upper Salinas River Watershed in San Luis Obispo County and continue outreach in existing areas to eligible growers.

• Conduct trainings for farmers and ranchers and agricultural assistance agencies on how to navigate the permitting process and how to use Permit Coordination Programs where available.

Funding Mechanisms and Incentives

To help offset some of the costs of voluntary water quality protection work, there is a need to develop funding and economic incentives to assist landowners and tenants to invest in agricultural management measures, and to promote long-term economic benefits.

While cost share funding is available through federal, state and private sources, many growers are not familiar with or lack current information about the funding and/or the application procedures. AWQA partners have expanded their contacts with growers and industry groups to provide information about funding sources, especially cost share options. Partners have also written collaborative funding proposals to leverage funding regionally. In addition, a number of workshops have been presented to assist with the application process.

To date:

• San Mateo County RCD developed a workshop on NRCS Environmental Quality Incentives Program (EQIP) funding.

• NRCS staff have attended existing growers meetings to present funding opportunities to these groups. For example, NRCS attended an ALBA Farmscaping workshop and presented EQIP information to the 60 attendees.

• Santa Cruz County RCD and the RCD of Monterey County have used grant funding to develop their own cost-share programs for farmers and ranchers that invest in water quality protection projects.

• RCD staff have compiled databases of funding sources for field staff to use in consultations with growers.

• Funding opportunities are presented at every Farm and Ranch Water Quality Planning course.

• As a result of increased promotion of funding programs in 2004, 83 agricultural producers in the six-county region have committed nearly $4 million of their own resources towards environmental quality protection workto match $4 million of cost share funding contracts from NRCS. This is a significant increase in farmer interest compared to past years.

Grassed rural road

Public Lands and Rural Roads

Roadways in rural areas can generate erosion and cause sedimentation problems if not properly designed and/or maintained. There is a need to improve both public and private planning and maintenance practices for rural roadways in order to properly dispose of runoff and reduce erosion. In addition, there is a need for education and technical assistance for management and maintenance of the growing number of public trust lands in the region. The budgets for water quality improvements on these lands are often limited and creative solutions are needed. A variety of workshops and trainings have been offered by AWQA partners:

• Road maintenance training workshops for Public Works staff have been presented in Santa Cruz, San Mateo, and San Luis Obispo Counties by the local RCDs and UCCE.

• Guidelines for road maintenance practices that can prevent sedimentation and erosion have been finalized in Santa Cruz County and will be distributed to other counties for adoption of similar practice standardization. Upper Salinas-Las Tablas RCD prepared criteria for road construction that reduces erosion and sedimentation.

• Nine private rural road drainage improvement projects were implemented in the San Lorenzo River watershed to reduce erosion and sediment runoff into the San Lorenzo River and its tributaries through the Santa Cruz County RCD Roads Program.

• Santa Cruz County RCD held road drainage improvement workshops with road practice demonstrations in the San Lorenzo River, Soquel Creek, and Aptos/Valencia Creek watersheds for State Park employees, County of Santa Cruz and Monterey County Public Works employees and private road associations.

• Updated, printed and distributed the "Private Roads Maintenance Guide for Santa Cruz County", a 70 page booklet that covers erosion, drainage, road construction, road maintenance, vegetation, road associations, County Service Areas, and various resource contacts.

• Developed and distributed Volume 1 of the Santa Cruz RCD Roads Program newsletter, Volume 2 of the newsletter will be distributed in December 2004/ January 2005.

On the Ground Results

Since the Agriculture Plan was released, the NRCS and RCDs have helped farmers and ranchers to develop conservation plans for over 200,000 acres of crop and range land. Conservation plans have already been applied on over 157,000 acres of crop and range land. According to NRCS calculations, this has resulted in over 50,000 acres protected from soil erosion. This has the added benefit of reducing runoff of persistent pesticides which stick to soil particles. In 2004, 83 farmers and ranchers were awarded cost-share contracts and will have conservation plans developed on an additional 55,000 acres. Nearly as many producers requested funding but had to be turned away due to lack of funds and staffing. The growing interest by farmers and ranchers in protecting water quality and other natural resources will be reflected in an increase in applications for NRCS assistance in 2005.

An estimated total of 450,000 tons of soil per year were prevented from eroding into the Sanctuary (equivalent to the area of a football field piled 23 stories high). Additionally, 433 acres now have improved irrigation management practices that conserve water and prevent runoff and leaching.

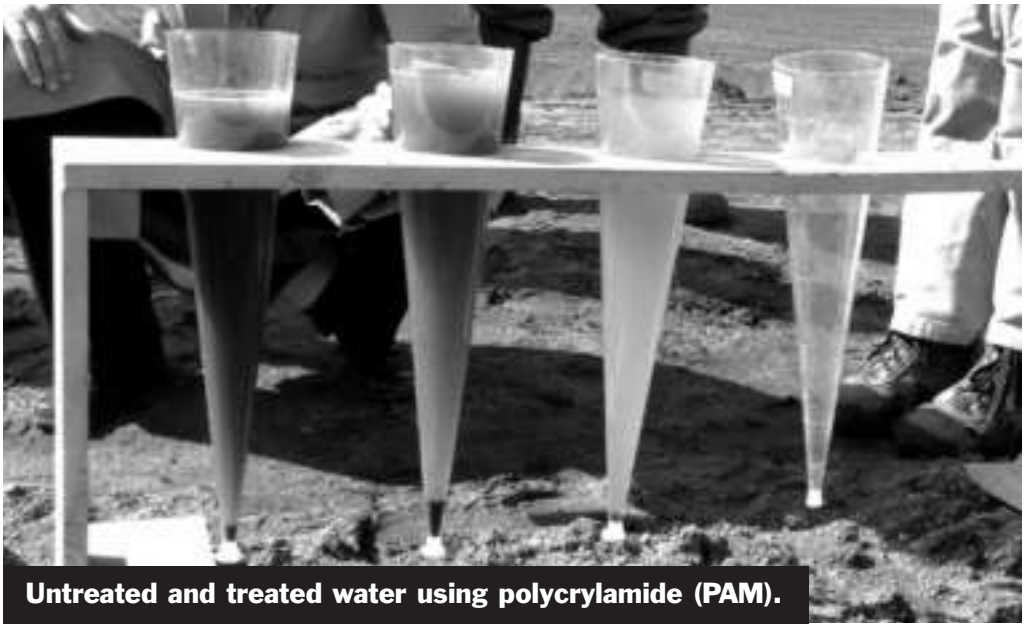
To prevent erosion and retain crop residue, 3,258 acres have improved tillage management practices. Over 2,200 acres of grassed buffers have been installed around cropland to protect water quality, including the reduction of nitrate runoff. Over 175,000 acres are covered by prescribed grazing management to prevent overgrazing and reduce runoff and erosion.

IV. WATER QUALITY MONITORING

The ultimate measure of this program's effectiveness will be the change in long-term water quality trends. However, documenting these changes is a challenging endeavor because of the multiple temporal and spatial scales involved. Improvements may take years to be reflected in water quality measurements, and these measurements will need to take place on several scales, which adds significant costs and complexity to the process. Responding to this challenge, Agriculture Plan partners have initiated several monitoring programs that are establishing baseline water quality information to which future results can be compared. Eventually over time, this data will begin to establish the program's success. The monitoring programs fall into three general categories:

- Regional Monitoring – programs that measure water quality over large areas that include several watersheds. These often utilize several methodologies to evaluate water quality and potential impacts, and are primarily conducted by the State and Regional Water Boards.
- Watershed Monitoring – smaller scale programs that focus on individual watersheds that are often more focused on a few parameters. Watershed monitoring is often conducted by industry-led groups, agencies, researchers, or volunteers.
- Site-specific monitoring – projects that seek to evaluate local water quality conditions or practice effectiveness of management measures. These projects are often conducted by the growers themselves or by researchers.

But with all of these programs comes the need to effectively coordinate them and package and disseminate data for decision makers. The Sanctuary Integrated Monitoring Network (SIMoN) has developed programs



Untreated and treated water using polycrylamide (PAM).

that are beginning to fill this need, and ongoing coordination by AWQA, a Technical Advisory Committee, and through a recent regional monitoring workshop has helped to drive this coordination process.

Several of these monitoring programs are briefly highlighted below.

Regional Monitoring

State Water Resources Control Board, Surface Water Ambient Monitoring Program (SWAMP)

SWAMP is a statewide monitoring effort designed to assess the conditions of surface waters throughout the state of California. The program is administered by State Water Resources Control Board (SWRCB) and implemented by the nine Regional Water Quality Control Boards (RWQCB). In areas covered by the Agriculture Plan, the Central Coast and the San Francisco RWQCBs are responsible for implementing SWAMP.

Central Coast Ambient Monitoring Program (CCAMP)

The Central Coast Ambient Monitoring Program (CCAMP) is the Central Coast Regional Water Quality Control Board's regionally scaled water quality monitoring and assessment program. The purpose of the program is to provide scientific information to Regional Board staff and the public, to protect, restore, and enhance the quality of the waters of central California. CCAMP monitoring programs that most directly relate to the Agricultural Plan include:

• Watersheds: The CCAMP monitoring strategy for watershed characterization calls for dividing the Region into five watershed rotation areas and conducting synoptic, tributary based sampling each year in one of the areas. Several methodologies are used including rapid bioassessment using benthic invertebrates, conventional water quality parameter analysis, chemical analysis of tissue, water, and sediment, toxicity evaluations, habitat assessments, sedimentation evaluations.

• Groundwater: The CCAMP strategy for groundwater assessment calls for acquiring and making accessible monitoring data from agencies with existing databases and ongoing groundwater data collection such as the Department of Health Services and the Department of Water Resources.

More information about CCAMP can be found on the internet at www.ccamp.org

San Francisco Regional Water Quality Control Board

In October 1999 the San Francisco Bay Regional Water Quality Control Board developed a Regional Monitoring and Assessment Strategy (RMAS) in order to develop information for all waterbodies in the Region. The goal of the SWAMP funded program in region is to monitor and assess water quality in all of the watersheds in the region to determine whether beneficial uses are protected. More information about RMAS can be found on the internet at http://www.waterboards.ca.gov/sanfranciscobay/watershedmanagement.htm

Watershed-Scale Monitoring

Local research institutions have taken the lead in watershed-scale water quality monitoring, analysis and reporting. In several watersheds, the industry-led watershed working groups are taking the lead in initiating water quality monitoring.These groups are being assisted by several organizations who provide technical assistance, and in some cases free lab processing of samples. Below are some of the water quality monitoring programs and projects underway in the region.

The Watershed Institute, California State University, Monterey Bay

The institute is assisting with monitoring and analysis of water quality data for the Chualar, Pacheco, Uvas/Carnadero, and Watsonville area Watershed Working Groups. The Chualar group was the initial pilot project for the Watershed Working Group model, and subsequently has the longest running set of watershed-scale water quality data associated with it.The groups is also monitoring water quality both in streams and on farms in collaboration with individual growers in the Salinas Valley, and in some cases is monitoring diazinon and chlorpyrifos in small agricultural streams in the Salinas Valley to assess the fate and transport of pesticides.

Center for Agroecology and Sustainable Food Systems (CASFS), University of California, Santa Cruz

CAFS provided stormwater runoff monitoring to a number of the growers participating in Watershed Working Groups and developed a water quality research program studying the physical and biological processes in fresh water streams, primarily focusing on the Pajaro River and Elkhorn Slough.

Monterey Bay Sanctuary Citizen Watershed Monitoring Network

The Network was created by the Ocean Conservancy and the Coastal Watershed Council (CWC – a local nonprofit organization dedicated to the protection of local watersheds, which is headquartered in Santa Cruz, California), in association with the Sanctuary's Water Quality Protection Program (WQPP). The Network along with the CWC coordinate several annual monitoring events, train and certify volunteer monitoring groups, and conduct targeted monitoring programs in sensitive areas. More information about the Network or the CWC can be found on the internet at http://www.montereybay.noaa.gov/monitoringnetwork/welcome.html, or http://www.coastal-watershed.org/.

Site-Specific Monitoring

NRCS and UCCE have compiled information about common monitoring techniques and equipment and provide this information to growers that attend the FWQP short course. Farmers are currently tracking the water quality on their properties to assess how well management practices are working and to inform future management decisions. This information is primarily kept confidential for farmer records only, unless they are involved in a cooperative research project. As members of Watershed Working Groups, farmers have been conducting sub-watershed scale monitoring to track long-term trends. Information has been submitted in Annual Reports to the Regional Water Quality Control Boards and some of the monitoring sites complement or overlap with existing RWQCB programs. A Water Quality Monitoring Technical Advisory Committee (TAC) was convened by the sanctuary and the Central Coast RWQCB (Region 3). The TAC was comprised of agency, industry and university representatives, and provided regional guidance in the development of appropriate monitoring protocols and a mechanism for tracking the implementation and effectiveness of management practices. One of the valuable lessons learned through the TAC is the difficult challenge of establishing a monitoring program that would adequately capture long-term trends, not be overly burdensome to growers and be economically feasible.

Sanctuary Integrated Monitoring Network (SIMoN)

A crucial aspect to water quality monitoring is conveying this information to decision and policy makers. In order to assist with this, the sanctuary initiated SIMoN, which is an integrated, long-term program that takes an ecosystem approach to identify and understand changes to the sanctuary. SIMoN provides a framework for the dissemination of water quality data through one of fifteen issue-orientated web pages that are found on its website. On the water quality page, viewers can access information about monitoring programs, including their results. The site also provides access to an interactive map that displays many of the water quality monitoring locations, as well as data about the sites and programs. Many of the programs listed above are listed on SIMoN. The SIMoN website can be found on the internet at www.mbnms-simon.org.

On-farm Practice Effectiveness

The Farm Bureaus, NRCS, RCDs, and the sanctuary have been providing initial training in water quality monitoring techniques to some of the Watershed Working Groups. For example, NRCS trains growers to use the Nitrate Quick Test which indicates the amounts of existing nitrate, allowing farmers to make better management decisions when applying fertilizer. The NRCS Water Quality Specialist works with Farm Bureau Coordinators to provide regular water monitoring and trend data at select sites throughout the region. RCD, NRCS

and UCCE have worked with individual farmers in Watershed Working Groups to develop demonstration and research projects to provide information for farmers on the efficacy of practices such as cover crops, irrigation water management, and furrow alignment.

Farm Bureau County Coordinators have been conducting individual site visits to assist watershed group participants in their self-assessments, including water quality monitoring.

Management Practice Effectiveness: Protecting Water Quality

UCCE has conducted in-field and controlled studies on the effectiveness of some management practices at achieving water quality protection goals. The Irrigation Advisor has been conducting research on:

- Phosphorus fertilization of cool season vegetables
- Cover cropping systems for vineyards
- Use of polyacrylamide (PAM) in sprinkler irrigation for improving farm water quality
- Improving irrigation efficiency of sprinklers

Next Steps:

- Identify funding for farmers willing to implement conservation practices in cooperation with local technical assistance staff and research institutions.

- Develop demonstration sites as part of the regional effort to develop practice effectiveness data.

Funding Acknowledgements

Over two million dollars in Congressional allocations and State and private grant allocations have been secured to fund this six-county effort. Conrgressman Sam Farr has been instrumental in securing the annual Congressional allocation. Additionally, a number of agencies are signatories of the Sanctuary's Water Quality Protection Program Memorandum of Agreement, allocating staff resources to the regional effort.